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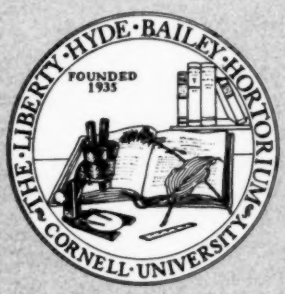

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Tripogandra grandiflora (Commelinaceae)

Harold E. Moore, Jr.

Tripogandra grandiflora is a species of the family Commelinaceae infrequently grown in the United States. It is said, however, to be frequently cultivated in the Petén region of Guatemala. A cutting from Longwood Gardens was received at Cornell University in 1959 having previously, in turn, been introduced from England as U.S.D.A. Plant Introduction no. 1243893.

When the waxy white flowers scented of orange blossoms began to open in early February, 1960, it was observed that the stamens were not in the position one would expect from an examination of the detailed illustration (as Donnellia grandiflora) that appeared in the Botanical Gazette 33: pl. 11, 1902 (see Fig. 24). That illustration was prepared from one of the type herbarium collections (H. von Tuerkheim 7684) and is inaccurate in respect to the position of the stamens in living flowers.

One of the characteristic features of Tripogandra is that the six stamens are usually dissimilar and in two series, those opposite the petals longest and generally supposed to be fertile, those opposite the sepals much shorter. Anthers of the latter are quite different in shape from those of the longer stamens, and have been supposed to be sterile.

The illustration mentioned above and reproduced here as figure 24 shows the stamens spreading in regular alternation. Such is true with regard to their points of origin, and in bud they are regularly and alternately arranged. In life they assume a position quite different so that the androecium appears to be irregular. The longer stamens are erect and lined up in front of the upper petal and sepals, with the upper slender naked portion of the filament bent slightly backward. The white moniliform hairs are arranged in such a fashion that the hairs highest on the filaments face toward the style and form an essentially continuous tuft. Those hairs borne lower on the filaments face toward the sepals and petal and form another but less distinct tuft. In order to achieve this position, the longer filaments opposite the anterior petals bend behind the shorter filaments above

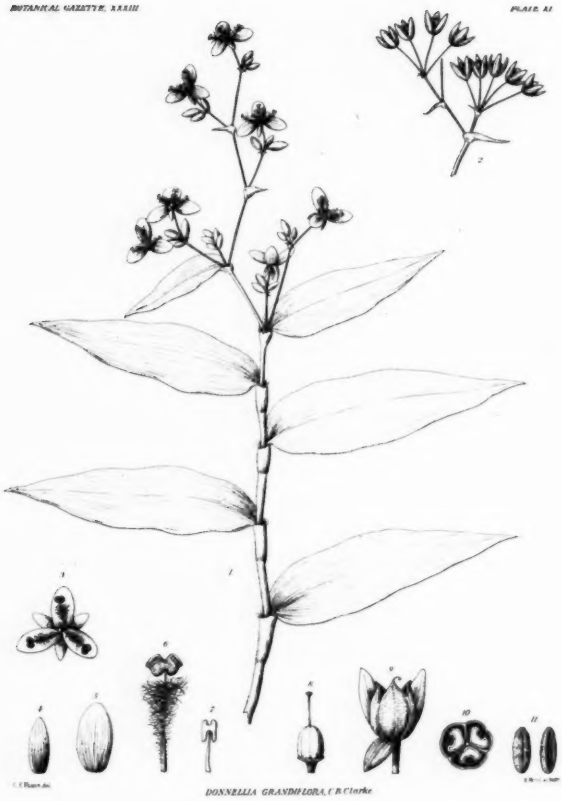


Fig. 24 Tripogandra grandiflora (as Donnellia grandiflora), reproduced from Botanical Gazette 33: pl. 11, 1902.

them, then become erect (Fig. 26). The large brilliant orange connectives and smaller yellow anther-sacs and pollen against the white petals appear to form a lure which resembles the pollen masses on the hind legs of a bee. The anthers in bud have the locules at the base, and at anthesis tip outward to expose pollen on the inner side.

The shorter stamens are quite different. Their filaments are subulate and smooth, the narrow connective, though somewhat gibbous, is nearly translucent and the anther-sacs and pollen are both white. The rims of the open sacs, however, are very narrowly lined with violet. Moreover, the anthers, which are extrorse in bud, tip inward so that their open locules are directed upward and lie in a plane just above that of the short, pale, yellow-necked style and obscurely trifid, papillate stigma.

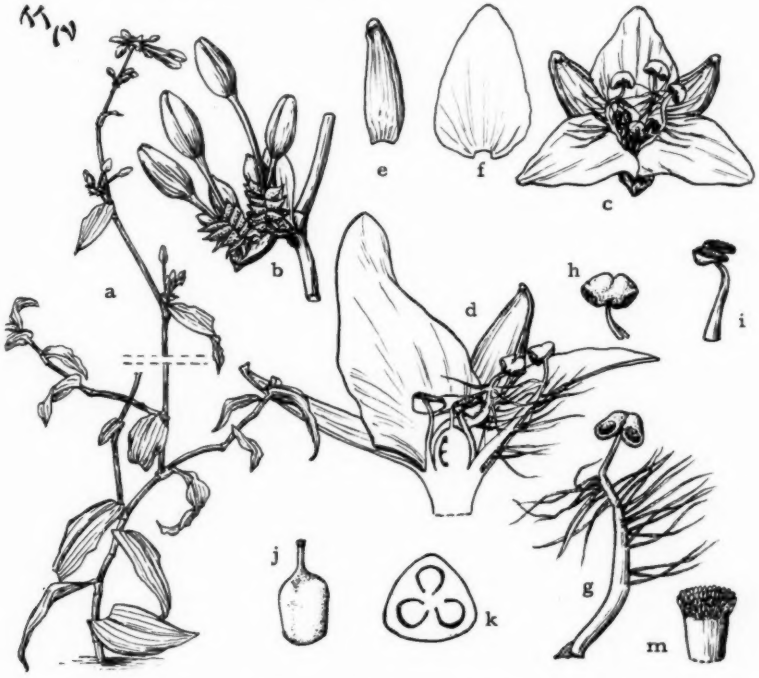


Fig. 25. Tripogandra grandiflora: a, habit x 1/3; b, paired cincinni x 1/2; c, flower x 2 1/2; d, flower in vertical section x 4; e, sepal x 2 1/2; f, petal x 2 1/2; g, inner stamen x 5; h, anther of inner stamen, reverse view x 5; i, outer stamen x 5; j, pistil x 5; k, ovary in cross section x 8; m, stigma x 24.

This arrangement suggests dependence on insect pollinators. Apparently out-crossing is necessary in this species, for attempts to hand-pollinate the single clone in cultivation have been unsuccessful.

A further observation must be made. Donnell-Smith, when he described this species as Callisia grandiflora, stated that the longer stamens were fertile, the shorter stamens sterile. This is not true. Pollen of the longer stamens is sterile. Pollen of the shorter stamens is both abundant and fertile, germinating rapidly when sown on agar. It differs, furthermore, from sterile pollen of the longer stamens in color, size, shape, and pattern of the exine. A more detailed discussion of these differences and of cytology will be provided in a later article now in preparation by Dr. R. E. Lee. It seems likely that a similar modification of the androecium occurs throughout the genus but such modifications, especially of position, are difficult to observe in herbarium specimens. A study of Tripogandra from living material, which is easily grown and propagated, and also from plants in the wild state should prove a challenging and fascinating biological problem. It is interesting to note that a similar morphology is suggested for the type species of Tripogandra, T. multiflora, in the plant figured as Tradescantia multiflora for Jacquin's Icones Plantarum Rariorum 2: pl. 355, 1790, reproduced here as figure 27. T. amplexicaulis (Klotzsch ex C. B. Clarke) Woodson is somewhat different in having the white filaments of the longer stamens conspicuously ventricose below the anthers, the shorter and fertile stamens pink and sagittate.

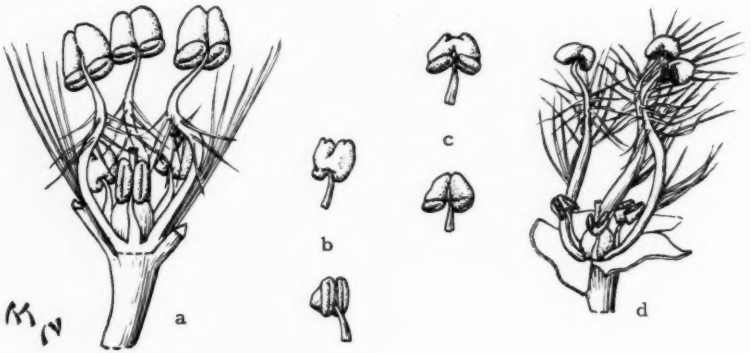


Fig. 26. Tripogandra grandiflora: a, androecium in bud stage, with perianth removed x 8; b, two views of an outer anther, in bud stage x 5; c, two views of an inner anther, in bud stage x 5; d, androecium at anthesis, with sepals removed but petal-bases shown x 4.

Fig. 27. Tripogandra multiflora, redrawn from portion of original figure (as Tradescantia multiflora) in Jacquin, Icones Plantarum Rariorum 2: pl. 355, 1790, showing pistil, flower, a shorter stamen in two views, and a longer stamen.

Each of the three locules of the capsule was said to be one-seeded in the original description and it was largely because of the few seeds that Clarke erected the genus Donnellia (later renamed Neodonnellia). Standley and Steyermark (Flora of Guatemala), however, say that usually two seeds are formed in each capsule, a statement borne out by examination of isotype and limited additional material at the Harvard University Herbarium. It is likely that often only two locules are fertile, each initially with two ovules. Thus T. grandiflora does not differ fundamentally from other species of the genus with respect to the pistil. Nor does it differ in basic chromosome number (x = 8), although it is tetraploid, with a complement of 2n = 32 (Wu, Papers of the Michigan Academy of Science, Arts and Letters 27: 120, 1942; Celarier, Bulletin of the Torrey Botanical Club 82: 31, 1955). It does differ in being a clambering herb with stems to three meters long (according to Standley and Steyermark) and in having the paired cincinni from axils of leaves, reduced leaves, and bractlike sheaths toward the tip of the rather markedly flexuous apical part of the stem. The flowers are large for the genus. These differences are not sufficient to maintain the genus Neodonnellia apart. The essential synonymy and a description of T. grandiflora follow.

Tripogandra grandiflora (Donnell-Smith) Woodson, Annals of the Missouri Botanical Garden 29: 153, 1942; Standley and Steyermark, Flora of Guatemala, Fieldiana: Botany 24(3): 38, 1952. (Fig. 25.)

Callisia grandiflora Donnell-Smith, Botanical Gazette 31: 125, 1901.

Donnellia grandiflora (Donnell-Smith) C. B. Clarke, Botanical Gazette 33: 261, 1902.

Neodonnellia grandiflora (Donnell-Smith) Rose, Proceedings of the Biological Society of Washington 19: 96, 1906.

Tripogandra grandiflora is a much-branched clambering herb with reddish-green or dark-green green-flecked stems glabrous except for a line of short hairs below each sheath. The two-ranked glabrous leaves are elliptic to oblong-lanceolate, glossy dark green with slightly paler nerves above, light green and glossy below, the light green sheaths about 1 cm. long, long-ciliate at the margin and with a line of short hairs along the side opposite the blade, the latter 5.5-12 cm. long, 1.5-3 cm. wide. Four to five pairs of cincinni are borne on reddish-green pale-flecked peduncles to 3.5 cm. long from the axils of leaves, reduced leaves, and bractlike sheaths along the somewhat flexuous apex of the stem, each pair subtended by ovate bracts and the few to eventually numerous smooth-pedicelled flowers each with a bracteole, the pedicels to 1.5 cm. long. Sepals green, to 9 mm. long, exceeded by the waxy white reflexed lanceolate petals. Stamens are six in two series: those opposite the

petals longest and at anthesis erect and contiguous through bending at the base of the filaments of the two lower ones, the white filaments white-bearded in two patches, the inner patch higher, the outer lower, the thick connectives brilliant orange with yellow locules and sterile yellow pollen; those opposite the sepals shorter with glabrous white subulate filaments and white anthers with narrow gibbous translucent connective and elongate locules bearing white fertile pollen. The white ovary is trilocular with 2 uniseriate ovules in each locule, the style shorter than the shorter stamens with a yellow band near the tip, the stigma papillate and obsecurely trilobed. Fruit is a capsule with 1 seed in each of 2 locules, the third sometimes or perhaps always sterile. The seeds are elongate, ca. 4.5 mm. long, 1.5 mm. wide, roughened on the ventral and lateral sides, with elongate hilum and dorsal embryostega.

A NEW VARIANT OF ILEX VOMITORIA

Ilex vomitoria Aiton forma pendula Foret et Solymosy.

Arbusculus 10 m. altitudine, a forma typica ramis pendulis differens.

Small tree to 10 m. with pendulous branches. Apical growth of central leader upright during the first year, becoming pendulous after lignification, remaining so for the life of the plant. Young growth slightly purplish, puberulent; leaves with short petioles (2-4 mm.), oval, oblong or oblanceolate, obtusish, crenate with brown horny teeth, glabrous, dark green (RHSCC p: 187, No. 0960, Spinach green) above, light green (RHSCC p: 175, No. 860/2, Scheeles green) beneath, 25-30 mm. long by 10-13 mm. wide; fruit 4-6 mm. in diameter, more or less clustered, bright red, persistent through the winter.

This new variant of Ilex vomitoria Aiton has been found by Price Magee of the Folsom Nursery in an area of about 80 acres extending southeast from Folsom, La. It is believed that this Ilex - the only weeping holly known so far - will become a landscape plant of outstanding ornamental value. Rapid growth and profuse fruiting, not to mention the habitus of the straight downward-pointing branches, makes this plant suitable for solitaire accent planting or for groups and natural screens. Easily propagated by cuttings or by seed. The sexually propagated progeny inherits the characteristics of the parent.

Type: open woods, area south of the First Baptist Church, Folsom, La., June 24, 1960, Sigmond L. Solymosy, SLI 561 (Southwestern Louisiana Institute Ornamental Horticulture Herbarium).

James A. Foret and Sigmond L. Solymosy
Southwestern Louisiana Institute
Lafayette, Louisiana

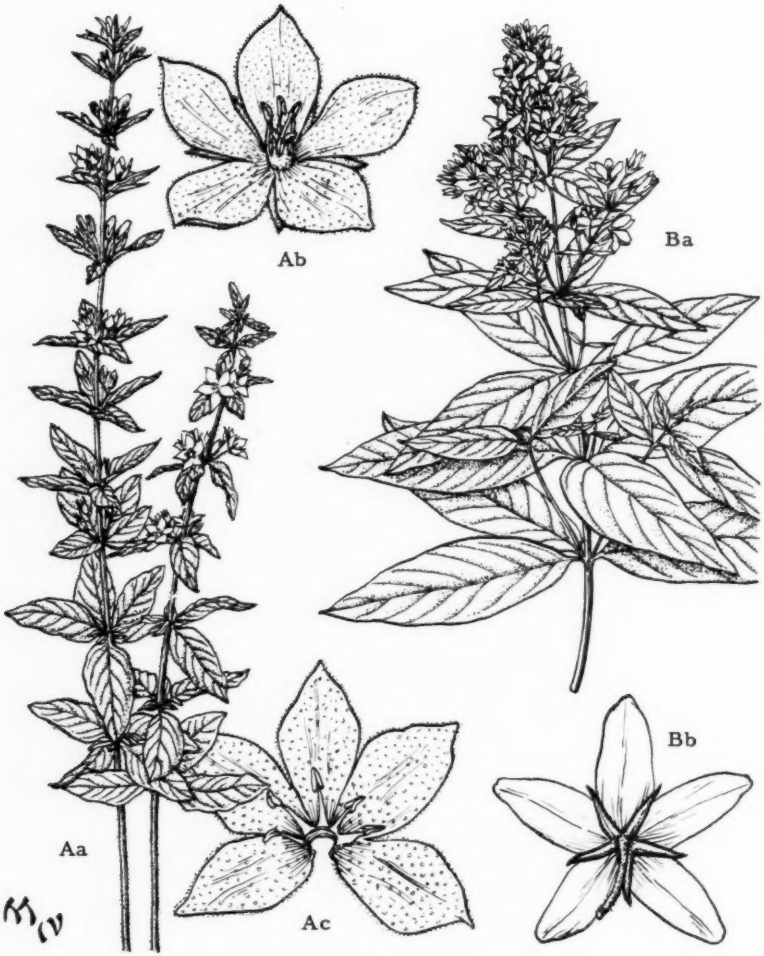


Fig. 28. A, Lysimachia punctata: a, habit x 1/4; b, flower x 2; c, corolla expanded, with attached stamens x 2. B, Lysimachia vulgaris: a, upper portion of plant x 2/5; b, flower, view from underside, showing black-margined sepals x 2.

Notes on the Cultivated Primulaceae
1. Lysimachia

John Ingram

The Primula family furnishes several genera of attractive plants suitable for gardens in many parts of the United States. Lysimachia is the second-largest genus of this family, with about 165 species known to science. Although some 15 species are offered currently in the trade in the United States, exclusive of Alaska and Hawaii, only three or four are commonly found in our gardens.

Members of the genus Lysimachia are perhaps better known to the gardener by the common name loosestrife, not to be confused with the genus Lythrum, which is also known as loosestrife. Some species of Lythrum may bear some slight superficial resemblance to certain lysimachias; the two genera, however, are not closely related.

Lysimachia was named in honor of King Lysimachus of Thrace. The origin of the common name loosestrife is legendary and supposedly, in antiquity, some element of the genus was used to pacify recalcitrant oxen. The origin of this practice, according to the tale, began with King Lysimachus, who was once pursued by an incensed bull, and as a last resort, seized a plant of Lysimachia and waved it before the maddened creature, thus tranquilizing him. Loosestrife, of course, is a literal translation of the Greek word Lysimachia.

Lysimachia has attracted periodically the attention of a number of botanists since Linnaeus established it as a genus, using the name Tournefort had assigned it earlier. Linnaeus accounted for 11 species in his Species Plantarum, ed. 1, 146-148, 1753.

Two important monographs of the Primula family, treating them on the basis of world-wide distribution, should be mentioned. Duby was the author of the first account, which was published in 1844 in the eighth volume of de Candolle's Prodromus, with the commentary concerning Lysimachia included from page 60 through 67. Duby accounted for 41 species of Lysimachia in addition to three species allied to it, each of which he placed in a genus by itself. Duby provided each species with a Latin description, which generally

adequately describes the particular taxon. Since this publication does not include a comprehensive key to each species, it is not a work that can be used readily by the layman.

At the turn of the present century, under the guidance of Adolph Engler, one of botany's greatest organizers, administrators, and editors, Das Pflanzenreich was begun. Like the earlier Prodromus of de Candolle, Das Pflanzenreich was a projected effort to monograph, on a world basis, all families and genera of seed plants. To date, over one hundred volumes of this great work have been published, beginning with the Musaceae in 1900.[1]

All the descriptions of families, genera, and species which have been included in Das Pflanzenreich are written in Latin. However, the detailed information dealing with history of the taxon, gross morphology, anatomy, and general distribution are given in German. This limits the usefulness of this work for persons unfamiliar with Latin or lacking a reading knowledge of German.

The Primulaceae were among the first families to be presented in this series (Das Pflanzenreich 22 (IV. 237): 1-386, 1905); this was the second important world monograph of the family. The introductory remarks concerning the family and the account of the genus Primula were written by Pax, a man perhaps better known for his extensive research on the Euphorbiaceae. The remainder of the work, including the treatment of Lysimachia (pages 256-313), was written by Knuth. Although Knuth's contribution is essentially compilatory and much fault has been found with some of his determina-

[1] Volumes of Das Pflanzenreich were published as work was completed by the various specialists contributing the manuscripts, so the sequence of volumes does not indicate a phylogenetic arrangement of families. Under the system followed, each family was given a number, e.g., 1 Cycadaceae, 33 Liliaceae, 147 Euphorbiaceae, 237 Primulaceae and 280 Compositae. The number of the family reflects Engler's view on its evolutionary advancement. One can deduce from this assignment of numbers that, in Engler's system of classification, (1) the gymnosperms are the least advanced group of seed plants, (2) the cycads are the most primitive gymnosperms, (3) the monocots are less advanced than the dicots, and (4) the Compositae are the most advanced plant family.

Citations of references to Das Pflanzenreich may seem quite formidable to the person unacquainted with this vast enterprise. All references to this work include the Roman numeral IV, which indicates that the family referred to is a spermatophyte (seed plant). Quite frequently a reference to Das Pflanzenreich may cite only the family number and not mention the volume number, e.g., Das Pflanzenreich IV. 147(6): 111-115, 1912. From the reference given, one would know that the author was referring to part 6 of the treatment on the Euphorbiaceae. When all volumes of this work are shelved by the volume number, in sequence according to date of publication, the various parts of monographs of families may not necessarily be in consecutive order, especially for the larger families; the inclusion of the volume number, therefore, greatly aids in locating one's reference; e.g., Das Pflanzenreich 57 (IV. 147 pt. 6): 111-115, 1912, is located more easily than the same reference as cited above where the volume number was not given.

tions and his systematic arrangement of the genus, he diligently and exactly copied the original descriptions of the original authors. That portion of his work, therefore, is accurate and very useful to subsequent students of this group of plants.

Central Asia is the geographic area reported as having the greatest number of native species of Lysimachia, and as more specimens from this area of the world became available for study, Handel-Mazzetti, the fourth European botanist to make a special study of this group of plants, outlined the genus and presented a key to the species of this area. His work, entitled "A Revision of the Chinese Species of Lysimachia, with a New System of the Whole Genus," was published in Notes from the Royal Botanic Garden, Edinburgh 16: 51-122, 1928. Again, the person unfamiliar with Latin would be unable to use this key to the 83 species from this region, and even though there is a lengthy introduction to the problem, in English, only the new species are described in detail and these in Latin. There are notes, in English, for many of the species; however, they do not fully describe the species, but give such information as how a given species may differ from another, or how the author's opinion disagrees with that of Knuth. Whereas Knuth employed such characters as habit, position of leaves, and type of inflorescence in determining relationships within the genus, Handel-Mazzatti, while using these characteristics, placed greater emphasis on floral morthology, so that the systematic arrangement arrived at by these two men is, in certain respects, very different.

For those interested persons with a good command of reading German, the monograph of Lysimachia by Klatt, "Die Gattung 'Lysimachia' L.," Abhandlungen aus dem gebeite der Naturwissenschafte . . . Hamburg 4: 1-45, 1866, may prove to be of use. One of the outstanding contributions made by Klatt is the inclusion of 24 plates illustrating all 45 species treated in his text.

The most recent paper treating species of Lysimachia systematically is by James D. Ray, Jr., "The Genus Lysimachia in the New World," Illinois Biological Monographs 24: 1-160, 1956. Dr. Ray's exhaustive study is of limited scope since it treats only 21 of the many species of the genus, but it will be of particular interest to those persons wanting to collect and identify native species, since the work gives keys, full descriptions, and photographs of typical specimens for most of the species included (omitted are photographs of four common species, all frequently cultivated). In addition to this information, the distribution of each species native in Canada and the United States, exclusive of Hawaii, is plotted on a map.

As is frequently the situation with larger genera, generic limits have been an issue causing much discussion and disagreement, not so much among the monographers of the genus, but among authors of floras and manuals. Various attempts, beginning with Moench in

1802 and Rafinesque in 1820 when they published respectively the genera Naumburgia and Steironema, have been made to segregate certain species into smaller genera. The trend among monographers has been to accept the larger genus Lysimachia as composed of subgenera, which in Ray's opinion are five; however, other authors have treated the subcategories as merely sections of the genus.

Two species, Lysimachia ciliata and L. thyrsiflora, included here in the genus Lysimachia as recommended by Ray, are retained respectively in the genera Steironema and Naumburgia by certain other modern-day taxonomists. Table 1 summarizes the thought on this

Taxonomic Work	Lysimachia ciliata	Lysimachia thyrsiflora
Fernald, Gray's Manual of Botany, 1950	Lysimachia	Lysimachia
Stevens, Handbook of North Dakota Plants, 1950	Lysimachia	Lysimachia
Abrams, Illustrated Flora of the Pacific States, 1951	Steironema	Naumburgia
Gleason, New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada, 1952	Steironema	Naumburgia
Davis, Flora of Idaho, 1952	Lysimachia	Lysimachia
Clapham, Tutin and Warburg, Flora of the British Isles, 1952	Lysimachia	Naumburgia
Weber, Handbook of Plants of the Colorado Front Range, 1953	Lysimachia	Lysimachia
Harrington, Manual of the Plants of Colorado, 1954	Lysimachia	Lysimachia
Jones and Fuller, Vascular Plants of Illinois, 1955	Lysimachia	Lysimachia
Dandy, List of British Vascular Plants, 1958	Lysimachia	Lysimachia
Hitchcock, Cronquist, Ownbey, and Thompson, Vascular Plants of the Pacific Northwest, 1959	Steironema	Lysimachia

Table 1. Comparison of the disposition of Lysimachia ciliata and L. thyrsiflora, in eleven taxonomic publications published between 1950 and 1959 and including both species.

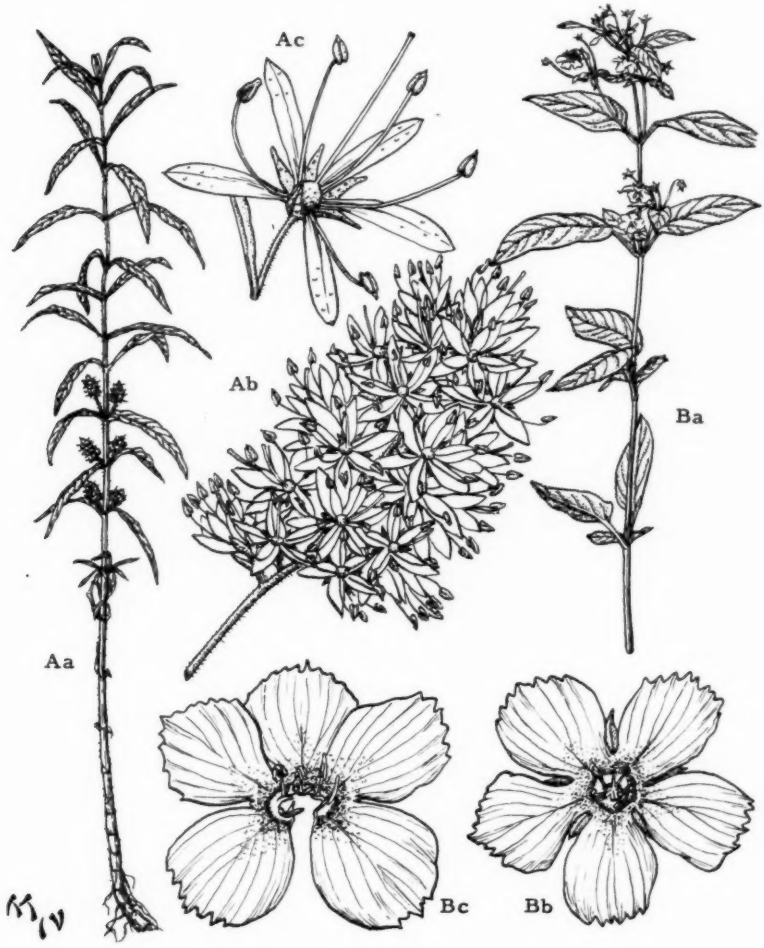


Fig. 29. A, Lysimachia thyrsiflora: a, habit x 1/5; b, single axillary raceme x 2; c, flower x 4. B, Lysimachia ciliata: a, habit, upper portion of plant x 1/5; b, flower, face view x 2; c, corolla expanded x 2.

subject by comparing the opinions of several authors of taxonomic works published in the United States and Great Britain between the years 1950 and 1959. Only those works which treat both species have been included. Of these eleven taxonomic publications, seven retain both species in the genus Lysimachia, whereas only two treat them both as belonging to the other genera. It is interesting to note also, that in two publications, one of the two species is retained in Lysimachia while the other is placed in its alternative genus.

Lysimachia is unquestionably a member of the Primulaceae since its members have gamopetalous corollas, their stamens opposite the corolla-lobes, and ovaries with free-central placentation. The genus is distinguished from such commonly cultivated genera as Primula, Androsace, Cyclamen, and Dodecatheon by its inflorescences' terminating leafy stems or its flowers' being borne in leaf-axils; the other genera have their flowers borne on naked scapes. Perhaps the cultivated genus it most closely resembles is Anagallis, a taxon which comprises generally smaller plants, having capsules which dehisce transversely rather than by valves. All lysimachias cultivated in this country are herbaceous, summer-blooming perennials. Aside from Lysimachia Nummularia, which is prostrate, the yellow-flowered species usually grow between 7.5 and 12 or 15 dm. tall, depending on the particular species. For example, in the best of conditions, Lysimachia lanceolata will grow to 7.5 dm., whereas L. ramosa and L. punctata can be expected to reach 12 dm., and L. vulgaris sometimes attains 15 dm. Of the white-flowered species, Lysimachia Ephemerum and L. clethroides are the tallest, growing to 10 dm., the rest of the species grow between 3 and 6 dm. tall.

Key to the Cultivated Species of Lysimachia

1. **Plants with prostrate stems; leaves suborbicular. . . . . L. Nummularia**
1. **Plants with ascending to erect stems; leaves linear, oblong, lanceolate, elliptic, spatulate, or ovate.**
   2. **Flowers yellow or yellow with dark streaks or dots.**
      3. **Leaves opposite or whorled.**
         4. **Flowers borne in leaf-axils or in leafy panicles.**
            5. **Flowers borne in leafy panicles; sepals with black margins. . . . . L. vulgaris**
            5. **Flowers borne in leaf-axils; sepals entirely green.**
               6. **Lower internodes of the stems densely hairy; leaves whorled, hairy, especially the lower surface. . . . . L. punctata**

Fig. 30. Lysimachia lobelioides, redrawn from Edwards's Botanical Register 28: pl. 6, 1842.

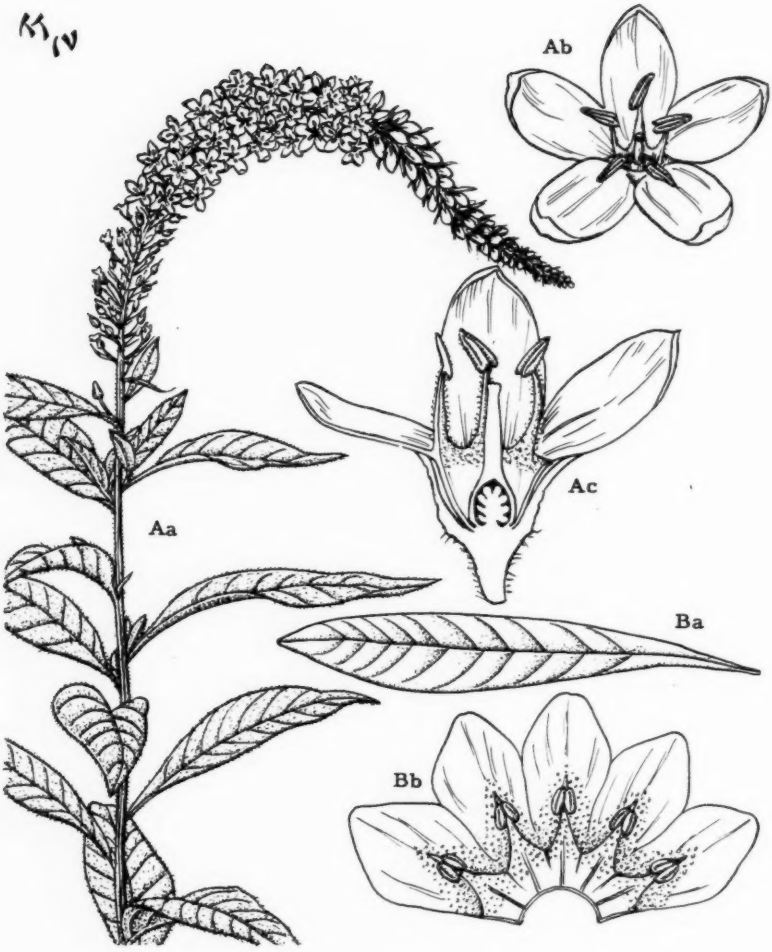


Fig. 31. A, Lysimachia clethroides: a, habit, upper portion of plant x 4/5; b, flower, face view x 5; c, flower in vertical section x 7. B, Lysimachia Fortunei: a, leaf x 1; b, corolla expanded x 7.

6. Lower internodes of the stems glabrous; leaves mostly opposite, glabrous except for ciliate margins and petioles.
   7. Leaves ovate or ovate-lanceolate, with rounded bases. . . . . L. ciliata
   7. Leaves linear or linear-lanceolate, with tapering bases. . . . . L. lanceolata
4. Flowers in axillary spicate racemes from the lower leaf-axils. . . . . L. thyrsiflora
3. Leaves alternate. . . . . L. ramosa
2. Flowers white, pinkish-white, pink, bluish, to purple.
   8. Leaves opposite, sessile and joined at the base. . . . . L. Ephemerum
   8. Leaves alternate, opposite, or whorled, not joined at the base.
      9. Flowers white.
         10. Leaves alternate.
            11. Anthers long-exserted. . . . . L. decurrens
            11. Anthers included.
               12. Leaves lanceolate, elliptic, or ovate, with acute or acuminate apices; bracts subtending the flowers tiny and scale-like.
                  13. Plants slender, glabrous or glandular-hairy in the inflorescence; corolla 3-4 mm. long, the corolla-lobes ovate. . . . . L. Fortunei
                  13. Plants robust, mostly with hairy stems, leaves, and inflorescence; corolla 6-9 mm. long, the corolla-lobes oblong or linear. . . . . L. clethroides
               12. Leaves spatulate, with rounded apices; bracts subtending flowers leaf-like. . . . . L. mauritiana
         10. Leaves opposite or whorled.
            14. Anthers included.
               15. Leaves lanceolate to elliptic; bracts of the inflorescence tiny and scale-like. . . . . L. Fortunei
               15. Leaves spatulate, with rounded apices; bracts of the inflorescence leaf-like. . . . . L. mauritiana
            14. Anthers long-exserted.
               16. Leaves 5-10 cm. long. . . . . L. decurrens
               16. Leaves 3-5 cm. long. . . . . L. lobelioides
      9. Flowers pink, pinkish-white, bluish, to purple.
         17. Leaves opposite or whorled, sometimes alternate; flowers pink, bluish, to purple, anthers long-exserted. . L. Leschenaultii
         17. Leaves alternate; flowers pinkish-white, anthers slightly exserted. . . . . L. lichiangensis

Lysimachia Nummularia Linnaeus, Species Plantarum, ed. 1, 148, 1753. Moneywort, creeping Jennie, creeping Charlie. This distinctive species is at once recognizable by its prostrate habit and

Fig. 32. Lysimachia Nummularia: a, habit x 4/5; b, flower, face view x 2; c, corolla, expanded x 2.

nearly round leaves. It does well on moist soil, is suitable for rock gardens, can be employed as a ground-cover, although it is inclined to become somewhat weedy, and is even grown as a submerged aquatic in aquaria. The fragrant yellow flowers make this a striking plant when it is in bloom. It is one of the species most frequently offered in the trade. Although a native of Europe, it has become established over much of eastern North America and sparingly on the Pacific Coast and in Colorado. The cultivar 'Aurea', with yellow foliage, is also offered.

Lysimachia vulgaris Linnaeus, Species Plantarum, ed. 1, 146, 1753. Garden loosestrife. This coarse, bushy herbaceous perennial is another of the more popular species. It is identified easily by its flowers' being in leafy terminal and axillary panicles, and by its very dark sepal-margins. This is another species adventive in eastern North America, coming originally from Europe and Asia, becoming established in protected moist areas.

Lysimachia punctata Linnaeus, Species Plantarum, ed. 1, 147, 1753. Garden loosestrife. Even though the common name of this plant is the same as that of the preceding, the two species are readily distinguishable in that Lysimachia punctata has its flowers borne in the upper leaf-axils, and, in addition, its sepals are entirely green. As in the preceding species, the leaves may be either opposite or whorled, and like it, it is a naturalized inhabitant of eastern

North America, having been introduced from Europe and frequently appearing as a weed in disturbed places such as roadsides and fields. This species is a fairly common garden plant, requiring less moisture than some of its relatives.

Lysimachia ciliata Linnaeus, Species Plantarum, ed. 1, 147, 1753 [Steironema ciliatum (Linnaeus) Baudo, Annales des Sciences Naturelles, Botanique II 20: 346, 1843]. The basis for including this species and the following one in Steironema is that each corolla-lobe encloses one stamen and there are staminodes alternating with the stamens. This species is a native of a great part of the United States and Canada, extending from Nova Scotia to British Columbia, south to Oregon, Utah, New Mexico, Arkansas, and northern Florida; it has become naturalized in Europe.

Lysimachia lanceolata Walter, Flora Caroliniana . . . 92, 1788 [Steironema lanceolatum (Walter) Gray, Proceedings of the American Academy of Arts and Sciences 12: 63, 1877]. This taxon is rare in cultivation. In nature the species comprises two subspecies, though subsp. hybrida (Michaux) J. D. Ray is not known to be in cultivation. Lysimachia lanceolata grows naturally from Pennsylvania to Wisconsin, south to northeastern Texas, Louisiana, and northern Florida.

Lysimachia thyrsiflora Linnaeus, Species Plantarum, ed. 1, 147, 1753 [Naumburgia thyrsiflora (Linnaeus) Reichenbach, Flora Germanica excursoria . . . 410, 1813]. Tufted loosestrife. This distinctive species is identified easily by its pale yellow flowers arranged in axillary spikelike racemes. Although lysimachias usually have 5-merous flowers, this one has flowers with the number of corolla-lobes varying quite consistently between 5 and 7. Its geographical distribution is circumboreal, making it a native of North America, Europe, and Asia.

Lysimachia ramosa Wallich ex Duby in de Candolle, Prodromus 8: 65, 1844. This is the only yellow-flowered cultivated species having alternate leaves. It is native to the eastern Himalayas, Ceylon, Java, and the Philippines.

Lysimachia Ephemerum Linnaeus, Species Plantarum, ed. 1, 146, 1753. Although this species has its flowers in a terminal raceme as is typical for the white-flowered species, it is readily distinguishable from the other cultivated members by its leaves, which are sessile and joined at the base. It is found, in the wild, in southwestern Europe.

Lysimachia Fortunei Maximowicz, Bulletin scientifique publié par l'Académie Impériale des Sciences de St. Pétersbourg 22: 68, 1868. This is a species difficult to separate from Lysimachia clethroides, because the over-all appearance of both is so similar. The difference lies in their respective sizes, and the shape of their cor-

Fig. 33. Lysimachia Ephemerum, redrawn from Pax and Knuth in Das Pflanzenreich 22 (IV. 237); fig. 61, p. 287, 1905. B, Lysimachia mauritiana, redrawn, op. cit., fig. 58, p. 274.

olla-lobes. Also, Lysimachia Fortunei apparently has a straight raceme throughout the time it is flowering. It is a native of Japan and China.

Lysimachia clethroides Duby in de Candolle, Prodromus 8: 61, 1844. Gooseneck loosestrife. Gardeners are likely to be familiar with this plant, as it is fairly common in cultivation; it is the most popular of the white-flowered species. It is an attractive plant with numerous stems topped by long curved racemes of many small white flowers. The inflorescence straightens as the fruits mature. Like Lysimachia Fortunei, this, too, is a member of the Japanese and Chinese floras.

Lysimachia decurrens Forster, Florulae Insularum Australium Prodromus, 12, 1786. Certain of the species of white-flowered lysimachias have a tendency to have alternate, opposite, or sub-opposite leaves; this is such a species. It is characterized by long-exserted anthers and leaves measuring over 5 cm. long. The range for Lysimachia decurrens is reported as India to southern China, Formosa, the Philippines, New Caledonia, Java, and Timor.

Lysimachia mauritiana Lamarck, Encyclopédie Méthodique 3: 592, 1789. This is a seashore species which is separable from related taxa by its leaves, which are blunt and spatulate, and by its leafy inflorescence. This species has a geographical range extending on both sides of the equator, from Japan, Korea, China, Formosa, the Philippines, Hawaii, to New Caledonia, the Marianas, and Mauritius.

Lysimachia lobelioides Wallich in Roxburg, Flora Indica . . . 2: 39, 1832. This white-flowered species from the northwest Himalayas is a near relative of Lysimachia decurrens, from which it is distinguished by its smaller leaves, measuring from 3-5 cm. long.

Lysimachia Leschenaultii Duby in de Candolle, Prodromus 8: 61, 1844. According to the literature, Lysimachia Leschenaultii has a variable flower-color ranging from pink to bluish or purplish. It is a native of India.

Lysimachia lichiangensis Forrest, Notes from the Royal Botanic Garden, Edinburgh 4: 237, 1908. Like the preceding species, this one does not have white flowers, but pinkish-white flowers. This is a native of China, as one might guess from its specific epithet. It was discovered in 1906 in Yunnan by Forrest while on one of his several expeditions to the high mountains of western China.

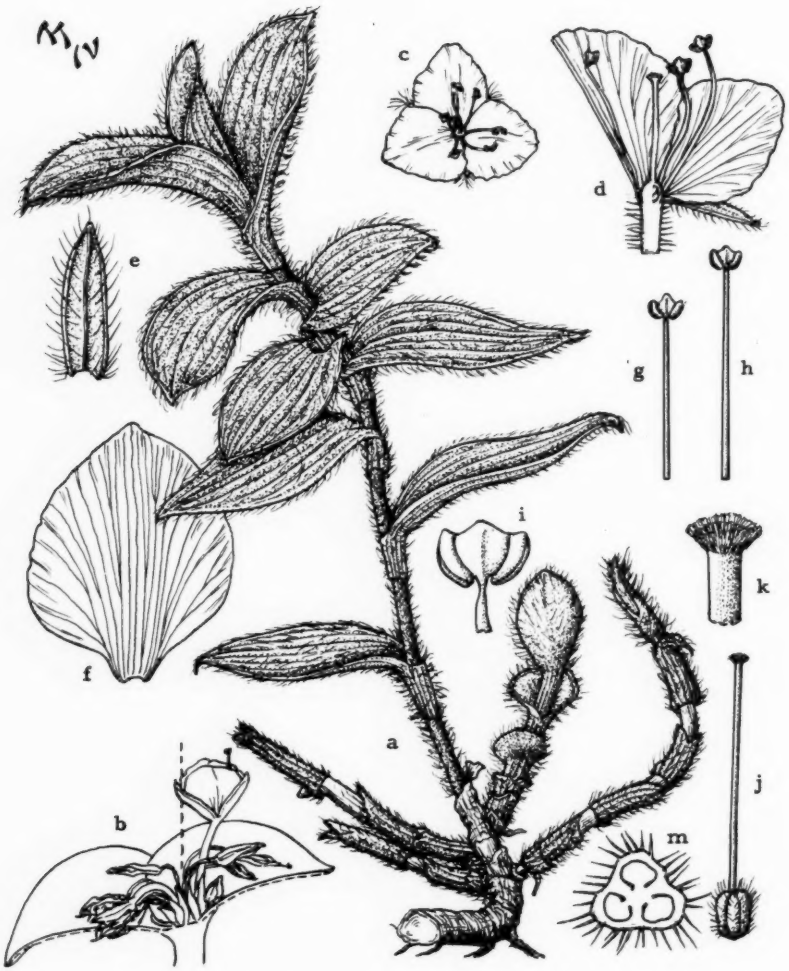


Fig. 34. Tradescantia pexata: a, habit x 4/5; b, inflorescence (with half of each of the two large bracts removed), diagrammed to show paired cincinni x 1; c, flower x 1; d, flower in vertical section x 2; e, sepal x 3; f, petal x 3; g, outer, shorter stamen x 3; h, inner, longer stamen x 3; i, anther x 8; j, pistil x 5; k, tip of style and stigma x 16; m, cross-section of ovary x 8.

Tradescantia pexata (Commelinaceae), a New Species

Harold E. Moore, Jr.

As tropical regions are explored for plants of horticultural value, species previously unknown to botany are occasionally introduced. Such a species is Tradescantia pexata, which was first received at the L. H. Bailey Hortorium for identification in February, 1959, from Mr. C. K. Le Fiell of Huntington Park, California. A year later Mr. A. B. Graf of Rutherford, New Jersey, forwarded a photograph of the same species for identification. In the interim, a plant had been illustrated in Exotica, ed. 2: 434, 1959, with the incorrect name Cyanotis veldthoutiana, and material has been offered for sale under the names Tradescantia 'White Velvet', T. 'White Gossamer', T. velutina, and T. villosa.

Tradescantia pexata was introduced to the wholesale trade by Hummel's Exotic Gardens of Carlsbad, California, the parent plant having been obtained from the collection of Dr. Meredith Morgan, Richmond, California, after his death. Thanks to Mr. Myron Kimnach of El Cerrito, California, the species has been traced from Dr. Morgan through the collection of Irwin D. Newcomb, also of Richmond, to Mrs. Alice Gobin in Paradise, California. There information ends. Unidentified specimens of a Tradescantia from the region of Monterrey, Mexico, in the Harvard University Herbarium agree in detail. Thus it can be assumed that the species is native in northeastern Mexico.

The covering of long, soft, white, several-celled hairs on all parts of living plants suggests the epithet pexata, from the Latin pexatus (covered with a napped garment). These hairs are like those found on Tradescantia crassifolia and a few other species from Mexico. Tradescantia pexata does not agree, however, with any species listed by Matuda in his treatment of Mexican Commelinaceae (Anales del Instituto de Biología 26(2): 303-432, 1955) nor with several omitted: T. Andrieuxii C. B. Clarke (as "Andreuxii"), T. cirrifera Martius, T. crinigera Nees, T. deficiens Brandegee, T. Herba-ratta Nees. The completely glabrous stamen-filaments at once distinguish T. pexata from T. crassifolia and the majority of species. The thick, much-branched rhizomes and the branches that penetrate the sheaths of reduced leaves at the nodes on the lower part of the stem are rarely found elsewhere in the genus.

Tradescantia pexata, as grown at Cornell University, fills a pot with a crown of many stems which have small ovate recurved leaves scarcely 1 cm. long, 1.2 cm. wide, at the lowermost nodes and short basal internodes. In the winter, short branches appear at many or sometimes all of these nodes, penetrating the sheaths. The older stems, at first ascending, become lax, trailing, and root at the nodes when in contact with the soil. Branches may also break through the sheaths of leaves along the upper portion of the stem though they normally emerge from the orifice of the sheath. The reddish internodes of mature stems (green on new growth) may reach a length of 5.5 cm. and the leaves are larger and ovate-elliptic. The long cottony hairs, so abundant everywhere, are at first erect but tend to become matted. The leaf-blades are shining medium green on both surfaces or with a vinous flush below, and the 6-10 nerves are obvious.

Flowers may appear at intervals but are produced most abundantly in the summer. The clear mallow-purple petals are large and ornamental. Fruit and seed have not been obtained by pollinating cultivated material nor are they present on the one fertile specimen from the wild state. It is to be hoped that future exploration will provide material to complete the following descriptions. In the meantime, plants in cultivation may be properly listed under a correct name. The description in large part and the illustration in entirety have been prepared from material of a single living clone at Cornell University.

Tradescantia pexata H. E. Moore, sp. nov.

Herba perennis rhizomatibus crassis ramosis, caulibus ramosis ascendentibus vel laxis et repentibus, dense et longe et molliter villosis, ramis vaginas ad nodos penetrantibus; cincinni terminales sessiles geminati in axillis duorum foliorum normalium; flores pedicellati, sepalis lanceolatis villosis 6-7 mm. longis, petalis obovatis roseis 12 mm. longis, 8 mm. latis, filamentis staminum glabris, antheris luteis trapezoidalibus, ovario villoso, stylo breviter trifido.

Plants perennial with an indument of long, soft, erect or matted white hairs throughout the aerial portion, the stems often much-branched, ascending or sometimes nearly prostrate, from branched membranous-sheathed rhizomes with thick roots, aerial branches penetrating the sheaths at the nodes near the base of the stem but toward the apex arising through the orifice of the sheaths, the internodes short and leaf-blades lacking or small near the base but the upper internodes reddish (except for green new growth), to 5.5 cm. long, 4 mm. in diameter. Leaves essentially distichous, the sheaths 5-7 mm. high, the blades elliptic-ovate, often recurved toward the tip, to 8.5 cm. long, to 4.5 cm. wide, with 6-10 or even more rather prominent longitudinal nerves. Paired cincinni are terminal on the stems and branches, sessile in axils of a pair of unmodified leaves

to 5 cm. long, 2.8-4.2 cm. wide, the flowers several in each cincinnus, the villous pedicels to 1.5 cm. long and erect at anthesis, becoming reflexed after anthesis. Sepals lanceolate, green, villous outside, glabrous within, 6-7 mm. long; petals obovate, mallow-purple (R.H.S. Colour chart 630), ca. 12 mm. long, 8 mm. wide when dry, 14 mm. long, 10 mm. wide when fresh, stamens 6 in two slightly dissimilar series, those opposite the petals longest, the filaments mallow-purple, glabrous, the anthers yellow with trapezoidal connective broadest at the apex, ovary villous, style mallow-purple, glabrous, stigma glandular-papillate, capitate or briefly trifid. Fruit and seed not known.

Type: cultivated at Cornell University, Ithaca, N.Y., H.E. Moore, Jr. 7750, July, 1959 (in flower); 7750 bis, 23 February, 1960 (vegetative). Deposited in the herbarium of the L. H. Bailey Hortorium.

Additional material examined: MEXICO: State of Nuevo Leon, Cerro de la Silla, Monterrey, 28 August 1937, Stephen S. White and Roy M. Chatters 30 (GH); Sierra Madre Mountains, Monterrey, 14 July, 1933, C. H. and M. T. Mueller 22 (GH) (sterile).

Fig. 35. Tradescantia pexata, type clone, growing at Cornell University.

Fig. 36. Blechnum brasiliense cv. 'Crispum'.

The Species of Blechnum in Cultivation

Barbara Joe[1]

Ferns in both indoor and outdoor landscaping have received increased use in recent years. One worthy but little publicized genus in cultivation is Blechnum (Lomaria).

Greenhouse species were cultivated as early as 1671 when Blechnum australe was reported from the King's Garden in England. Undoubtedly the temperate native Blechnum Spicant or deer fern was in gardens before that time. The subsequent centuries have seen a rise and a later decline in the number of species cultivated. When parlor plants were in style, tropical and subtropical ferns were favorites, but with the passing of that era, many of the tender Blechnums also passed out of cultivation.

To gardeners of temperate areas, B. Spicant is the most familiar species. The foliage of this hardy fern is often eaten by deer, hence the common name deer fern. Blechnum occidentale is perhaps the most familiar species in the warmer parts of the United States, where a renewed interest in this group of ferns has developed, particularly in Southern California. New species or species formerly little-cultivated have been introduced into the trade in large numbers, with more introductions on the way. Some of these ferns have reached the more temperate areas of the nation, where they are successful greenhouse and indoor subjects.

Most ferns require a soil rich in organic matter and a constant supply of moisture at their roots. This is generally true of the Blechnums, except for B. occidentale, which can tolerate a heavier and drier soil than others in the group. The part-time gardener, who may miss a watering or two, would do well to adopt this fern. Blechnums are generally adapted to a relatively dry atmosphere. Aside from the deer fern, most Blechnums desire a day temperature of 65 F. or more; lower temperatures correspondingly reduce the amount of new growth and attractiveness of the foliage. Blechnum occidentale tolerates light frost by becoming deciduous. Commercial fertilizers applied at half the recommended amounts

[1]Los Angeles, California

are beneficial in speeding up the growth and improving the foliage of the plant, and at least a yearly mulching with peat moss or other suitable material is most important. As the root system is not deep, any cultivation around the plant should be avoided. Propagation is by spores, and by division in species with creeping rhizomes.

Species of Blechnum are generally coarse, stiff, terrestrial or subarborescent ferns. Their fasciculate fronds form an interesting rosette pattern, particularly in species that have the crown elevated on a short trunk-like rhizome. Other species may have creeping or ascending to erect rhizomes. The scales of the rhizome are linear, harsh, and often black. The pinnatifid or pinnate fronds are usually leathery and smooth with the margins entire or serrate. Some species have the fertile fronds contracted. The veins are free and forked. The long, continuous sori are formed on each side of the midrib of the pinna and parallel to it. The firm indusium is shaped like the sorus, flap-like and opening toward the midrib. Blechnums are most readily identified by this arrangement and shape of the sori and indusia. The 200 species are mostly distributed in the southern hemisphere, some also occur in the tropics of the northern hemisphere, and one species, B. Spicant, reaches the North Temperate Zone.

Of the fourteen species of Blechnum reported by the Bailey Hortorium to be at present in cultivation, several are limited to botanical gardens or special collections, while others have been offered to the trade only as spores. As new species are introduced from time to time, some may not have come to the attention of this horticultural inventory. Any notice of such omissions will be appreciated. The following is a key to the species of Blechnum known in cultivation in the United States and Canada.

Key to the Cultivated Species of Blechnum

1. Fertile fronds reduced or contracted.
   2. Fronds deeply pinnatifid, sometimes the lower pinnae free.
      3. Fronds linear-lanceolate. . . . . B. Spicant
      3. Fronds oblong-elliptic to oblanceolate.
         4. Pinnae lobed, the apex truncate, notched, or bifid, bearing a fringe of cilia; blade equal to or to 2 times longer than leaf-stalk. . . . . B. Moorei
         4. Pinnae not lobed, the apex rounded or narrowing gradually to a point, not bearing a conspicuous fringe of cilia; blade 4 or more times longer than leaf-stalk.
            5. Rhizome stout, not trunk-like; leaf-stalk brownish-black, polished, scaly only at base; fronds to 15 cm. wide. . . B. discolor
            5. Rhizome a short trunk; leaf-stalk usually light tan, not polished, scaly throughout; fronds to 30 cm. wide. . . . . B. gibbum

2. Fronds simply pinnate, sometimes pinnatifid toward the apex of frond.
   6. Fronds to 5 cm. wide; midrib densely scaly; pinnae broadly oblong and rounded. . . . . B. fluviatile
   6. Fronds 10 cm. wide or more; pinnae linear, acuminate.
      7. Stipe shorter than blade; pinnae not falcate. . . . . B. capense
      7. Stipe as long as the blade; pinnae falcate. . . . . B. lineatum
1. Fertile fronds similar to the sterile.
   8. Fronds pinnatifid, or with lowest pinnae free.
      9. Fronds lanceolate, 4-8 cm. wide; not a small tree fern. . . B. unilaterale
      9. Fronds oblong-oblanceolate, 30 cm. wide or more; small tree fern. . . . . B. brasiliense
   8. Fronds simply pinnate in lower half or throughout.
      10. Pinnae 3-6 on each side of frond. . . . . B. fraxineum
      10. Pinnae more than 8 on each side of frond.
         11. Upper margin of pinnae with a large ear; soral lines midway between midrib and edge. . . . . B. auriculatum
         11. Upper margin of pinnae without a large ear; soral lines next to midrib.
            12. Lower pinnae reduced to very small ears. . . . . B. orientale
            12. Lower pinnae not reduced to small ears.
               13. Fronds pinnate in lower half; pinnae subentire, lowest deflexed, not articulate. . . . . B. occidentale
               13. Fronds pinnate throughout; pinnae strongly spinulose-serrate, lowest not deflexed, articulate. . . . B. serrulatum

auriculatum Cavanilles [B. hastatum Kaulfuss; B. remotum Presl]. With short, stout, scaly stock; fronds to 6 dm. long, 5-10 cm. wide, lanceolate, simply pinnate; pinnae 20-40 on each side, the upper base of pinnae cordate with a large ear; soral line midway between midrib and edge, or nearer the margin. Temperate South America.

Reported in cultivation at the Montreal Botanic Garden, Montreal, and the University of California Botanic Garden, Berkeley.

brasiliense Desvaux. With dark-brown scaly trunk to 1 meter high; fronds to 1 meter long, 38 cm. wide, oblong-lanceolate, deeply pinnatifid, the base tapering gradually, the pinnae usually connected at the base. Brazil, Peru.

Cultivated in conservatories in several areas of the nation, outdoors in southern California and parts of Florida. Suitable tub species. A horticultural form, cv. 'Crispum', with undulate margins, crowded pinnae, and smaller fronds which are red when young is also frequently cultivated; referred to B. corcovadense Raddi var. crispum by some authors.

capense (Linnaeus) Schlechtendahl [Lomaria capensis Willdenow]. With a stout scaly trunk; fronds dimorphic, the sterile to 1 meter long, 3 dm. wide, ovate, simply pinnate, with a terminal pinna; pinnae to 20 on each side, linear, 8-30 cm. long, 12-25 mm. wide, the point narrowed gradually. South Africa.

Specimens from cultivated material were not available for study. Spores under this name have been offered for sale in this country, but whether these spores actually represented this species is not known, nor is it known whether mature plants exist in cultivation.

discolor (Forster) Keyserling [Lomaria discolor Willdenow]. With stout stock; leaf-stalk black, glossy, scaly at base, the mid-rib polished brownish-black, without scales; fronds dimorphic, the sterile to 1 meter long, to 15 cm. wide, oblong-oblanceolate, deeply pinnatifid, the base tapering gradually. Australia, New Zealand.

Spores under this name have been offered for sale. A specimen collected at the Harvard University Botanic Garden in 1918 is on file at the L. H. Bailey Hortorium.

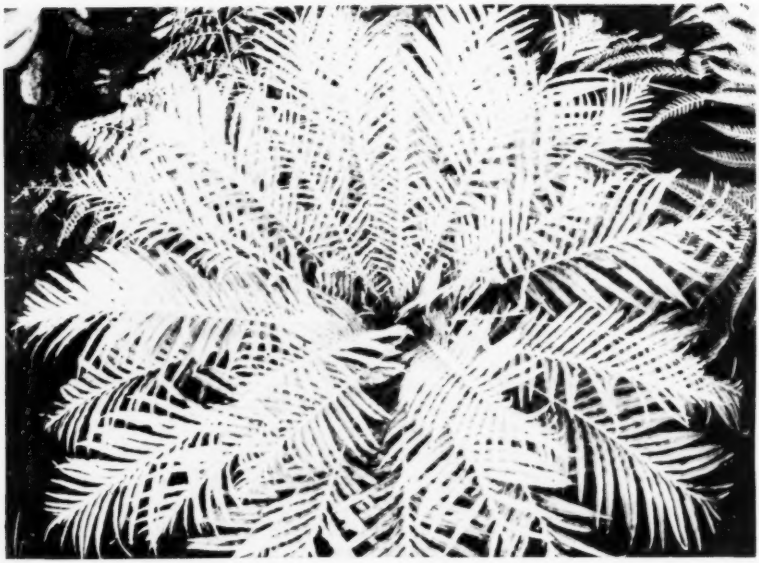


Fig. 37. Blechnum gibbum.

fluviatile (R. Brown) Salomon [Lomaria fluviatilis Sprengel]. Trunkless or nearly so; fronds dimorphic, to 7.5 dm. long, 4-5 cm. wide, linear, simple pinnate, the midrib densely scaly throughout; sterile pinnae broadly oblong and obtuse, the fertile linear and obtuse. New Zealand, Australia.

Reported by the Bailey Hortorium to be in cultivation. Herbarium specimens of cultivated material were not available for study.

fraxineum Willdenow [B. longifolium Humboldt, Bonpland, & Kunth]. With slender creeping rhizome; leaf-stalk slender, 1.5-3 dm. long; fronds pinnate, the blade to 3 dm. long, to 2 dm. wide; terminal pinnae large, the lateral pinnae 3-6 on each side, strongly falcate. American Tropics.

Reported in cultivation at the University of California Botanic Garden, Berkeley.

gibbum (La Billardière) Mettenius [Lomaria gibba La Billardière]. With black, scaly trunk to 1 meter high; leaf-stalk and lower half of midrib with black scales; fronds dimorphic, the sterile to 1 meter long, almost spreading horizontally, to 1 meter long, 3 dm. wide, oblong-elliptic, deeply pinnatifid, the base tapering gradually. New Caledonia, Aneityum, Isle of Pines in South Pacific.

Cultivated in conservatories throughout United States, and outdoors in southern California. Suitable tub species. Somewhat variable under cultivation: cv. 'Platypteris' is correctly used to denote a large rapid-growing form with many erect, fertile fronds bearing sterile spores. Subject to fungus infections.

The material presently passing erroneously as B. Moorei is apparently an unnamed form of B. gibbum. This variant is distinguished from the species by having fewer, more erect fronds with fewer pinnae; pinnae wider, 9 mm. or more wide, strongly serrate; leaf-stalk, midrib, and costae of young fronds usually reddish-pink, texture more leathery. It surpasses the species in popularity because the foliage remains attractive throughout the winter in mild climates and because it seems to be more resistant to fungus infections.

lineatum (Swartz) C. Christensen [Lomaria lineata Willdenow]. Trunk stout, to 10 cm. high, scaly; fronds dimorphic, the sterile to 1.5 meter long, to 4.5 dm. wide, oblong to narrowly lanceolate, simple pinnate, with a terminal pinna; pinnae 20-40 on each side, falcate, greyish-green, the margins serrate, subrevolute. American Tropics.

Reported in cultivation at the University of California Botanic Garden, Berkeley.

Moorei C. Christensen [Lomaria ciliata Moore]. Trunk to 3 dm. high, 4 cm. thick; leaf-stalk blackish, equal to blade or one-half as long; fronds dimorphic, the sterile to 6 dm. long, to 3 dm. wide, ovate-oblong, deeply pinnatifid, narrowed below; pinnae slightly lobed on basal side, the apex acuminate or more often truncate, notched or bifid, bearing a fringe of cilia. New Caledonia.

Herbarium specimens taken from cultivated material were not available for study. It is doubtful that this plant actually exists in the trade, as the ferns presently passing as B. Moorei are referrable to B. gibbum as a variant.

occidentale Linnaeus. Rhizomes creeping underground, stoloniferous, then erect with foliage; fronds to 4.5 dm. long, 1-2 dm. wide, ovate-acuminate, simply pinnate in lower half of frond, pinnatifid above; pinnae linear, 12-24 on each side, falcate, narrowed to a bluntish point, the lower ones cordate, the lowest deflexed, not much smaller than those above. Tropical America.

Fig. 38. Blechnum gibbum, unnamed variant (cultivated commonly but incorrectly under the name Blechnum Moorei).

For greenhouse culture in most parts of the United States, outdoors in the South where it is easily grown; used as border or background plant. Young fronds attractive reddish-pink. Requires only light watering.

orientale Linnaeus. Trunk stout, to 6 dm. high or more; fronds to 1.5 meter long, to 1 meter wide, ovate, simply pinnate; pinnae many, linear, narrowed to a long point, the lowest reduced to very small ears. Australia, China, Himalayas, Malaysia.

Reported by the Bailey Hortorium to be in cultivation. No specimens of material cultivated in the United States were available for study.

serrulatum L. C. Richard. Saw Fern. Rhizome widely creeping underground; fronds 2-3 together, to 6 dm. long, to 3 dm. wide, linear to broadly oblong, simply pinnate throughout; pinnae numerous, narrowly oblong to linear, apex acute or acutish, inequilateral at base, articulate, spinulose-serrulate. America, Asia, Australia, New Caledonia. Native in parts of Florida. Suitable in boggy areas.

Spicant (Linnaeus) Roth. [Struthiopteris Spicant Weis; Lomaria Spicant Desvaux]. Deer fern. Rhizomes erect, frequently in clumps; fronds evergreen and hardy, dimorphic, the sterile to 10.7 dm. long, to 12.5 cm. wide, lanceolate-linear, deeply pinnatifid; pinnae many, close, oblong or oblong-linear, obtuse to acute. Alaska to California, Europe, Asia. Var. californicum, a horticultural name listed in the trade. Widely cultivated in temperate climates.

unilaterale Swartz. Rhizome creeping, stoloniferous, then erect; fronds to 6 dm. long, 8 cm. wide, lanceolate, pinnate at base, pinnatifid upwards; pinnae numerous, spreading, linear, 18-25 mm. long, the lower distant, small, broader than long, irregularly triangular, the margins entire or nearly so. Tropical America.

Known in cultivation only from a single plant at Jungle Garden Nursery, Culver City, California.

The author gratefully acknowledges the help of Drs. C. V. Morton of the U. S. National Museum, G. H. M. Lawrence of the Bailey Hortorium, M. E. Mathias of the University of California, Los Angeles, and Rolla Tryon of the Gray Herbarium, for their assistance in the preparation of this paper

Fig. 39. Blechnum auriculatum, showing large "ear" at base of upper margin of each pinna, and soral line midway between midrib and margin of pinna.

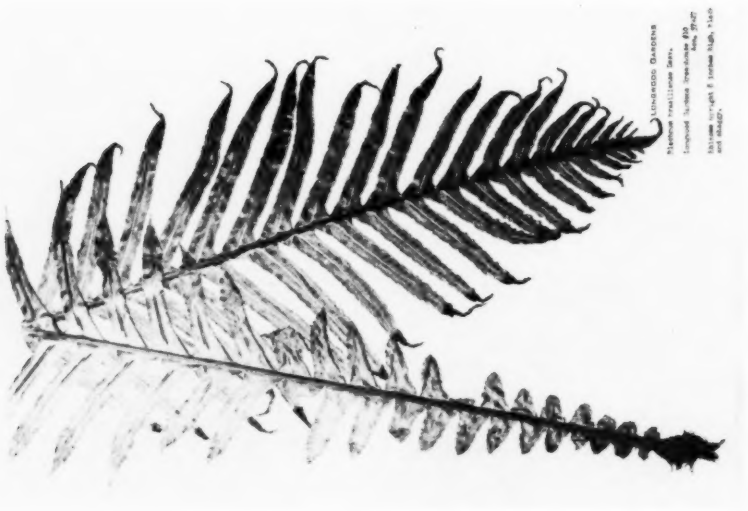


Fig. 40. Blechnum brasiliense, fertile frond.

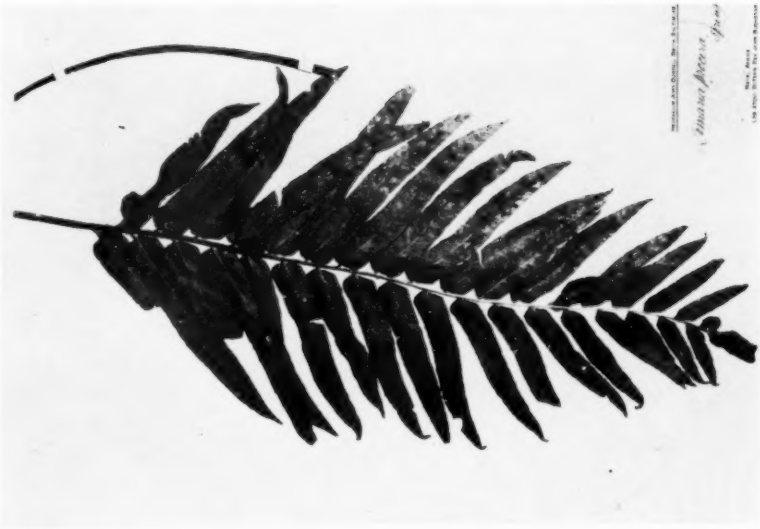


Fig. 41. Blechnum capense, sterile frond.

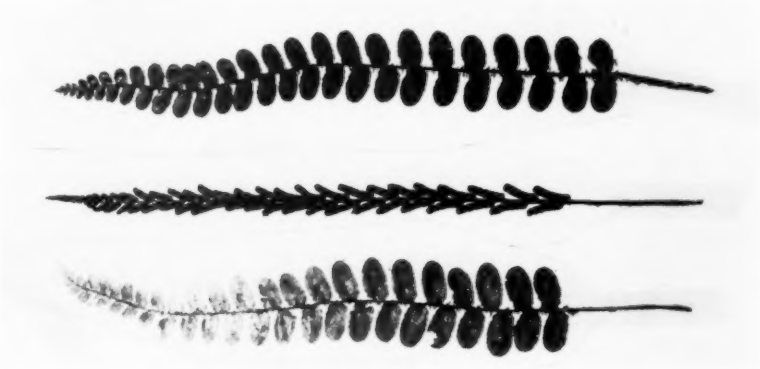


Fig. 42. Blechnum fluviatile, fertile and sterile fronds.

Fig. 43. Blechnum fraxineum.

Fig. 44. Blechnum discolor, fertile and sterile fronds.

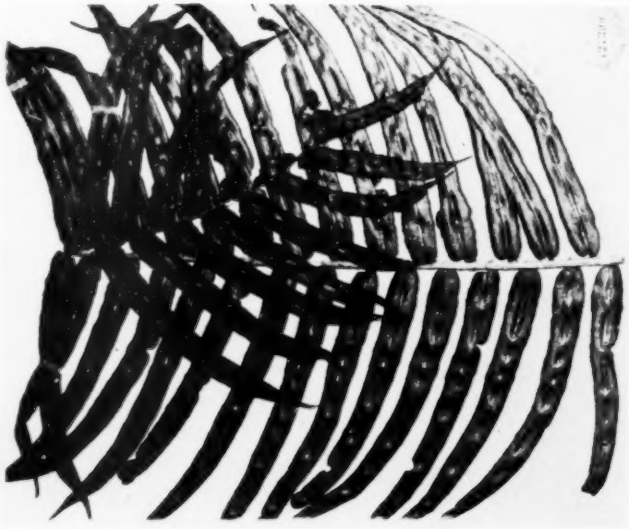


Fig. 45. Blechnum lineatum, upper third of sterile frond, showing falcate pinnae.

Fig. 46. Blechnum Moorei, fertile and sterile fronds. Pinnae ciliate and truncate, notched, or bifid at apices, the upper pinnae lobed at bases.

Fig. 47. Blechnum occidentale, sterile frond, pinnate in lower half, pinnatifid in the upper, with lowermost pinnae deflexed.

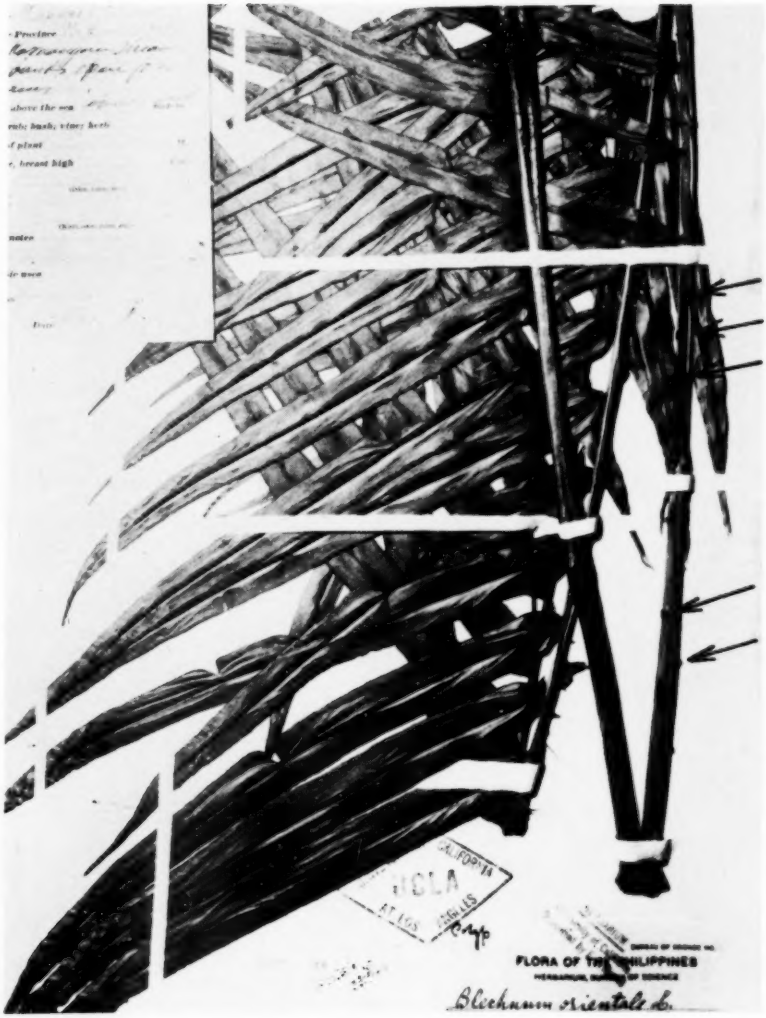


Fig. 48. Blechnum orientale, **much-folded fertile frond, with arrows indicating the small ear-like pinnae below the lowermost well-developed ones.**

Fig. 49. Blechnum Spicant, fertile and sterile fronds.

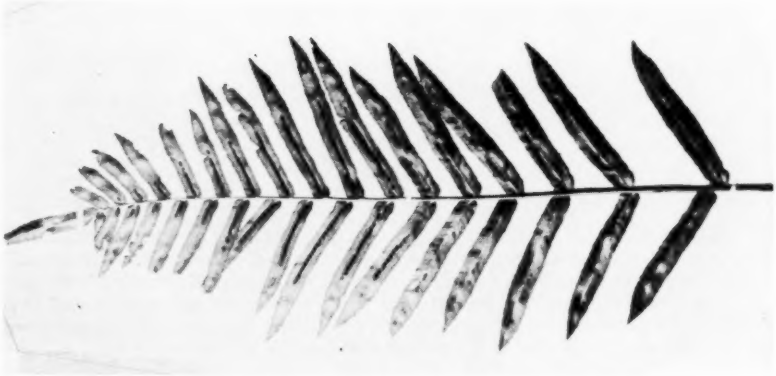


Fig. 50. Blechnum serrulatum, fertile frond, showing soral lines next to midribs of pinnae.

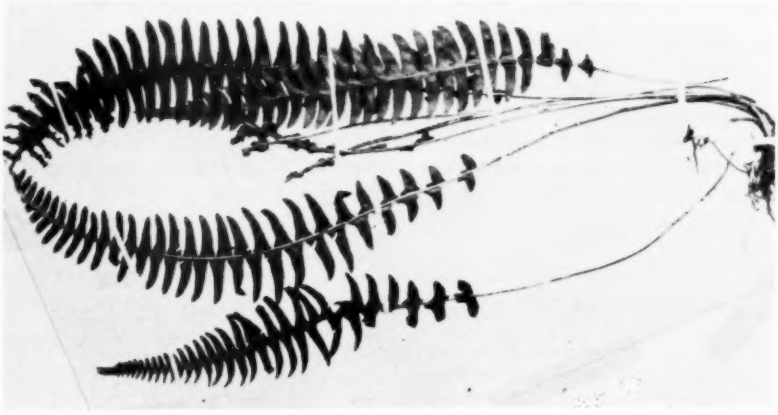


Fig. 51. Blechnum unilaterale, fertile and sterile fronds, pinnatifid throughout most of their length.

Names of Passiflora Hybrids

George H. M. Lawrence

Studies in the cultivated species of Passiflora indicate that the place and date of publication of some names of hybrids in this genus are not well known. Few of them are cited in Index Kewensis. Readers having information on places and dates of publication earlier than those given below, for any of the following names, are requested to communicate it to the editor of Baileya.

alato-caerulea: Lindley in Botanical Register 10: t. 848, 1824.
[P. alata × P. caerulea.]

albo-nigra: Regel in Gardenflora 1: t. 8, 1852.
[P. alata × P. Raddiana (= P. kermesina).]

Allardii: Lynch in Gardeners Chronicle n. s. 42: 274, 1907. A hybrid originated at the University Botanic Garden, Cambridge, England, by E. J. Allard.
[P. caerulea 'Constance Elliott' × P. quadrangularis.]

amabilis: C. Lemaire in Flore des Serres, ser. 1, 3: t. 209, 1847.
[Probably P. alata × P. racemosa.]

atropurpurea: Nicholson in Dictionary of Gardening 3: 30, 1886.
[P. racemosa × P. kermesina?]

Belottii: Moore & Ayres in Paxton's Magazine of Botany 1: 9, 1850.
[P. caeruleo-racemosa × P. quadrangularis.]

caeruleo-racemosa: Sabine in Loddiges Botanical Cabinet 6: t. 573, 1821.
[P. caerulea × P. racemosa.]

Colvillii: Sweet, British Flower Garden, Ser. 1, 2: t. 126, (Oct.) 1825.
[P. incarnata × P. caerulea.]
(I am indebted to Peter Yeo, Botanic Garden, Cambridge University, for checking this item and for determining the original spelling of the name to be Colvillii - and not Colvillei, as used in much of the literature.)

Descaisneana: Planchon in Flore des Serres, ser. 1, 8: 267, 1853.
[P. alata × P. quadrangularis.]

'Empress Eugénie' and 'Kaiserin Eugénie' are believed to be commercial synonyms of the cultivar 'Imperatrice Eugénie', which is considered to be a selection from P. × alato-caerulea.

exoniensis: L. H. Bailey in Standard Cyclopedia of Horticulture 5: 2485, 1916. Based on Tacsonia exoniensis L. H. Bailey in Cyclopedia of American Horticulture 4: 1765, 1902. [P. antioquiensis × P. mollissima.]

hybrida: Nees von Esenbeck in Nees & Sinning, Sammlung schönblühender Gewächse, t. 36, 1831. (Citation from Index Londinensis; original not seen.)

hybrida: Neubert in Deutsches Magazin für Garten - und Blumenkunde 4: 271-272, 1851.
[P. racemosa rubra × P. kermesina.]
One selection of this hybrid was named 'Philippine'. Neubert's earlier use of the epithet hybrida (op. cit. 2: col. pl. facing p. 240, 1849) was as a nomen nudum. He used it later (op. cit. 6: 335-336, with col. pl., 1853) for a hybrid of P. Loudonii × another hybrid [P. alata × P. caerulea]. At the same time (1853) he reported his P. hybrida of 1849 to have been the progeny of P. caerulea × P. alata. The three color plates published by Neubert are of three different plants. It is thus clear that Neubert used the epithet hybrida indiscriminately to designate any Passiflora hybrid, and any attempt to resurrect the name now could only lead to confusion.

Innesii: author and originator unknown. Nicholson (Dictionary of Gardening 3: 31, 1886) cites 1870 as date of introduction. [P. alata × P. macrocarpa (= P. quadrangularis).]

Lawsoniana: author and originator unknown. Nicholson (op. cit., p. 31) cites 1868 as date of introduction. Killip (The American Species of Passifloraceae, in Field Museum of Natural History. Botanical Series, 19: 341, 1938) notes that P. Lawsoniana Masters (1872), a southern Brazilian species not allied to this hybrid, belongs in P. truncata Regel. Parentage of the hybrid is generally given as P. racemosa × P. alata.

Loudonii: Sweet (fide Neubert, op. cit. 2: 259, 1849, where listed as "Londonii"). Place and date of original publication not known.
The Index Kewensis gives Loudin's Encyclopaedia of Plants, p. 1234, 1872 as the original place of publication.
[P. kermesina × P. racemosa fide Killip (op. cit., pp. 325, 399).]

kewensis: author and originator unknown. Cited by Nicholson (Century Supplement to the Dictionary of Gardening 2: 583, 1901) as introduced in 1888.

Munroi: author and originator unknown. Nicholson (Dictionary of Gardening 3: 31, 1886) cites 1868 as date of introduction, and P. alata × P. caerulea as its parentage.

Pfordtii: author and place of publication of the original description unknown. The earliest known reference is that ascribed to Masters (in The Garden 35: 572, 1889), which reads, in part: "We are glad to learn that this barbarous name, which has been given by someone to a plant which Dr. Lindley knew and named P. alato-caerulea, is to be heard no more. [Description follows] ..... It is a cross between P. alata and caerulea."

Bailey (Cyclopedia of American Horticulture 2: 1222, 1902) treated it as a synonym of P. alato-caerulea, as have all subsequent students until 1939 when, for no stated reason, Degener (Flora Hawaiiensis, Family 250) formally published Passiflora Pfordtii as a nomen novum for a hybrid of P. alata × P. caerulea, accompanying it with Latin diagnosis and a plate.

Plants passing under this name are currently offered by 24 commercial sources in the United States. The few specimens seen are not distinguishable from P. alato-caerulea. The name P. Pfordtii should be relegated to synonymy under P. alato-caerulea.

NOTICE OF A DIRECTORY OF SOURCES OF WOODY PLANTS

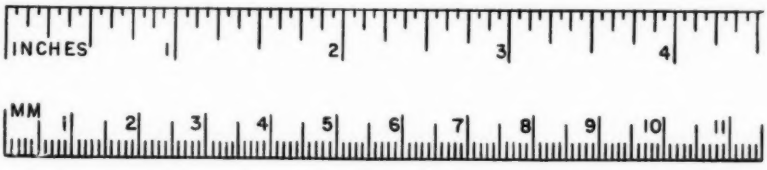
Trees and Shrubs for Every Purpose - Where to Buy Them (Vol. 16, No. 1 of Plants and Gardens. Spring, 1960), edited by Henry Teuscher. 64 pp., paperbound. Brooklyn Botanic Garden, Brooklyn 25, N. Y. $1.00.

Locating sources of particular kinds of plants may be difficult for the gardener interested in the out-of-the-ordinary, who often has no idea as to where he might turn for such information. This inexpensive handbook, which is the spring number of the Brooklyn Botanic Garden's series called Plants and Gardens, issued quarterly, is meant to be a handy sourcebook for the seeker of the unusual in woody plants. The trees and shrubs included are those suitable for eastern North America north of Florida. They are grouped according to their usefulness in cultivation (e. g., Dwarf Conifers; Flowering Trees), and each listing includes the plant's scientific and common names, its important characteristics, hardiness (keyed to a hardiness-zone map), and known commercial sources, from a list of 104 American and Canadian retail and wholesale nurseries. About 100 of the plants listed lack such sources, and readers of the handbook have been requested to supply this information if they have it.

W.J.D.

ABBREVIATIONS USED IN BAILEYA

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.